



Flagship species as fundraising tools

- their role in biodiversity conservation
and in environmental philanthropic behavior

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ABSTRACT

My thesis combines conservation biology and conservation psychology to explore factors associated with environmental philanthropic behavior, and more specifically donating to conservation flagships aiming to improve their use in conservation marketing campaigns. Flagship species, usually charismatic and aesthetically appealing mammals and birds are used by environmental non-governmental organizations (ENGOS) in two ways: 1) when appealing to the potential donors to attract funds for conservation projects and 2) when raising conservation awareness of the public. In this thesis, I concentrate on flagship species' usage from the conservation fundraising viewpoint. Because concentration on aesthetically pleasing species has also attracted criticism, there is a need to find additional ways to promote conservation projects. My aim is therefore to explore possibilities to use other donation targets in fundraising campaigns together with single species, as well as to find ways to help species and other targets, whose appearance is less attractive.

This thesis builds upon a summary and four chapters. In Chapter I, I studied which kind of motivations and donor characteristics are associated with donating to ecosystems and species representing two taxonomic groups, mammals and birds. In the second chapter, I examined which flagship attributes are associated with the choices between flagship species and other flagship types including flagship fleets (a set of flagship species), ecosystems and biodiversity. The main aim of these two chapters was to study

which kind of flagship types would be useful in fundraising campaigns, as well as to identify factors that make a conservation target appealing from the potential donors' viewpoint. My goal was also to find out whether the potential donors can be divided into donor segments based on their preferences.

Chapter III concentrates on real-life donation behavior. I measured both actual behavior by conducting a simple choice experiment and self-reported environmental philanthropic behavior by asking survey respondents questions about their past real-life donation behavior. The main aim was to study whether a variety of psychological and sociodemographic variables are associated with donations of money and time, ENGO-membership and the amount donated. Chapter IV reviews literature on surrogacy analysis and willingness to pay studies of conservation flagships.

The findings of my thesis emphasize the importance of segmenting environmental philanthropists based on their preferences. Common to all empirical studies in my thesis was that the potential donors favored both threatened targets as well as holistic flagship types that included biodiversity and ecosystems. According to these results, the range of donation targets in conservation fundraising campaigns could be wider than at present, although charismatic flagships also have their place as fundraising tools.

TIIVISTELMÄ

Tutkin luonnonsuojelubiologiaa ja luonnonsuojelopsykologiaa yhdistävässä väitöskirjassani tekijöitä, jotka ovat yhteydessä luonnonsuojelulle ja etenkin lippulaivalajeille lahjoittamiseen. Lippulaivalajit ovat yleensä karismaattisia ja esteettisesti vetovoimaisia lintuja ja nisäkkäitä, joita luonnonsuojelujärjestöt käyttävät kahdella tavalla: 1) vedotessaan lahjoittajiin kerätessä varoja luonnonsuojeluprojekteihin ja 2) herätellessään suuren yleisön suojelutietoisuutta. Keskityn väitöskirjatutkimuksessani lippulaivalajien käyttöön varainkeruun näkökulmasta. Koska esteettisesti vetovoimaisiin lajeihin keskittyminen voi aiheuttaa ongelmia, on tärkeää löytää rinnalle myös uudenlaisia tapoja markkinoida suojeluprojekteja. Tavoitteenani on siksi selvittää mahdollisuutta käyttää myös muunlaisia lahjoitusvaihtoehtoja varainkeruukampanjoissa yksittäisten lippulaivalajien lisänä sekä samalla löytää tapoja auttaa lajeja ja muita kohteita, jotka ovat ulkoiselta olemukseltaan vähemmän vetoavia.

Väitöskirjatyöni rakentuu yhteenvedosta ja neljästä osatyöstä. Ensimmäisessä osatyössä selvitin minkälaiset motivaatiot ja lahjoittajaan liittyvät tekijät ovat yhteydessä ekosysteemeille sekä linnuille ja nisäkkäille lahjoittamiseen. Toisessa osatyössä selvitin mitkä lippulaivalajin ominaisuudet ovat yhteydessä lippulaivalajien ja muiden lippulaivatyyppien välillä tehtäviin valintoihin. Muut lippulaivatyyppit sisälsivät lippulaivalajilaivastot (useamman lippulaivalajin muodostama ryhmä), elinympäristöt ja luonnon monimuotoisuuden. Näiden kahden ensimmäisen osatyön päättaroituksena oli selvittää, minkälaiset

lippulaivatyyppit olisivat varainkeruukampanjojen näkökulmasta hyödyllisimpiä sekä löytää tekijöitä, jotka tekevät lahjoituskohteesta potentiaalisen lahjoittajan kannalta vetovoimaisen. Tavoitteenani oli myös selvittää, voidaanko potentiaaliset lahjoittajat jakaa erillisiin segmentteihin heidän mieltymystensä perusteella.

Väitöskirjani kolmas osatyö keskittyy toteutuneeseen lahjoittamiskäyttäytymiseen. Mittasin todellista lahjoittamiskäyttäytymistä ja aiempaa itse-raportoitua lahjoittamiskäyttäytymistä. Kolmannessa osatyössä tavoitteena oli tutkia ovatko erilaiset psykologiset ja sosiodemografiset tekijät yhteydessä rahan ja ajan lahjoittamiseen, luonnonsuojelujärjestöjen jäsenyyteen sekä lahjoitettuun summaan. Neljäs osatyö on aiempien meta-analyyysien ja kirjallisuuskatsausten tulosten pohjalta tehty katsaus, jossa yhdistetään tieto lippulaivojen ekologisesta surrogaattivoimasta potentiaalisten lahjoittajien maksuhalukkuuteen näitä kohteita kohtaan.

Väitöskirjani tulokset korostavat lahjoittajien segmentoinnin tärkeyttä, mikä tulee tehdä lahjoittajien mieltymysten perusteella. Yhteistä kaikille tutkimukseeni kuuluneille empiirisille tutkimuksille oli, että potentiaaliset lahjoittajat suosivat sekä suojelutarpeessa olevia kohteita sekä holistisia lippulaivatyyppejä, joihin lukeutuvat biodiversiteetti ja ekosysteemit. Näiden tulosten perusteella lahjoituskohdevalikoima voisi olla nykyistä laajempi. Siitä huolimatta myös karismaattisilla lippulaivoilla on paikkansa varainkeruun työvälineenä

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LIST OF ORIGINAL PUBLICATIONS

This thesis consists of following publications:

- I **Piia Lundberg**, Annukka Vainio, Douglas C. MacMillan, Robert J. Smith, Diogo Veríssimo & Anni Arponen (2019). The effect of knowledge, species aesthetic appeal, familiarity and conservation need on willingness to donate, *Animal Conservation* 22(5), 432-443.
<https://doi.org/10.1111/acv.12477>
- II **Piia Lundberg**, Diogo Veríssimo, Annukka Vainio & Anni Arponen (2020). Preferences for different flagship types in fundraising for nature conservation. *Biological Conservation*, 250, 108738. <https://doi.org/10.1016/j.biocon.2020.108738>
- III **Piia Lundberg**, Annukka Vainio, Ann Ojala & Anni Arponen (2019.) Materialism, awareness of environmental consequences and environmental philanthropic behavior among potential donors, *Environmental Values* 28, 741-762.
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- IV **Piia Lundberg** & Anni Arponen. An overview of reviews of conservation flagships: evaluating fundraising ability and surrogate power. [manuscript]

Table of author contributions

Article	Original idea	Study design	Data collection	Methods and analysis	Manuscript preparation
I	AA, PL , AV	PL , AA, AV	PL	PL , AA, AV	PL , AA, AV, DV, RS, DM
II	AA	PL , DV	PL , DV*	PL , DV, AA, AV	PL , AA, DV, AV
III	PL , AV	PL , AV, AA	PL	PL , AV, AO, AA	PL , AV, AA, AO
IV	AA, PL	PL , AA	PL , AA	PL , AA	PL , AA

PL = Piia Lundberg, AA = Anni Arponen, AV = Annukka Vainio, AO = Ann Ojala, DV = Diogo Veríssimo, RS = Robert J. Smith, DM = Douglas C. MacMillan

* DV helped with disseminating the pilot survey

SUMMARY

Piia Lundberg

1. Introduction

Human wellbeing is in many ways built on biodiversity and the ecosystem services it provides, but the exploitation of these services is often unbalanced (Díaz et al. 2006; Cardinale et al. 2012). Rapid human population growth creates pressure to expand human land use to even more remote areas, which further weakens and alters natural habitats, and causes a loss of biodiversity at all its three levels: ecosystems, species and genes (Duraiappah et al. 2005). Reduced living space also leads to conflicts between humans and wildlife (Chartier et al. 2011), and together with alteration of habitats it can also lead to development of harmful diseases and disease outbreaks (Myers et al. 2013; de Sadeleer & Godfroid 2020; Gibb et al. 2020).

At present, the rate of biodiversity loss caused by human activities is unprecedented. For example, the populations of vertebrate species have declined by 68% within only the past four decades (WWF 2020). Regarding invertebrates, we do not even know how many species we are losing, as only a fraction of invertebrates have been scientifically described (Titley et al. 2017). However, biodiversity is not only relevant for human well-being, but also involves a wide range of moral issues including, for instance, the protection of biodiversity because of its intrinsic value (Díaz et al. 2006). For all of these reasons, it is vital to halt the loss of biodiversity.

Conservation of biodiversity requires both funding (Bennett et al. 2015; Veríssimo et al. 2017, 2018) and a change in people's attitudes and behaviors (Wright et al. 2015). Environmental non-governmental organizations (ENGOS) have an important role in

conservation outreach (Veríssimo et al. 2018). Through conservation marketing campaigns, ENGOS raise both conservation awareness of the general public as well as funds for conservation projects (Wright et al. 2015), which makes conservation marketing an integral part of conservation biology and thus biodiversity conservation. One problem is that conservation costs exceed available resources (Ando & Shah 2016). Due to insufficient monetary resources, more information is needed on how to increase donations to conservation (Ando & Shah 2016). Private donors (environmental philanthropists) are an important group supporting biodiversity conservation (Evans et al. 2012; Ando & Shah 2016), and therefore they are at the heart of conservation marketing. Besides private donors, also companies can donate money to charities (Mainardes et al. 2016), but in this thesis I concentrate on environmental philanthropy solely from the private donors' point of view.

The key in marketing strategies is to adjust the marketing to the target audience (Wright et al. 2015), which highlights the importance of knowing the preferences of the target audience. Therefore, from the conservation fundraising point of view, it is important to identify the drivers of environmental philanthropic behavior. When approaching potential donors, the ENGOS often use aesthetically pleasing species, flagship species, to appeal to this target group (Caro 2010a). Some species are featured in conservation marketing campaigns more often than others. For instance, the tiger (*Panthera tigris*) and the elephants (*Loxodonta africana* and *Elephas maximus*) are the most commonly used flagships in past conservation fundraising campaigns (Smith et al. 2012), and

these same species dominate the online news feed (Wright et al. 2020). The tiger and the elephant combine many of the qualities typical to flagship species: large body size, charisma and aesthetic appeal (cf. studies related to these attributes, e.g. Lišková & Frynta 2013; Frynta et al. 2013; Albert et al. 2018). These kind of species have also been called charismatic megafauna (Skibins et al. 2013; Di Minin & Moilanen 2014). However, we do not know whether this is the best strategy to approach potential donors (Home et al. 2009), especially as knowledge of biodiversity loss and its consequences accumulates constantly, and the general public can become increasingly aware of the problems related to loss of biodiversity (Singh 2002). What makes this problematic, in turn, is that the flagship species are sometimes also used as ecological surrogates for other species when locating conservation areas, although they are initially chosen based on other than ecological arguments (Smith et al. 2012; Skibins 2015; Horsley et al. 2020), which requires clarifying the role of flagship species.

Thus, to be able to use flagship species efficiently in fundraising, more information is needed on the factors associated with fundraising and surrogacy potential of these species, which is the first step towards understanding the cost-effectiveness of this approach. Based on previous studies, we already know that potential donors can vary in their preferences on what they would be willing to support (Choi & Fielding 2013; Kanagavel et al. 2014; Veríssimo et al. 2014b). Therefore, we need to identify factors that appeal to potential donors, and what information could be used to segment donors based on their preferences into separate donor segments for more targeted fundraising campaigns (Kanagavel et al. 2014; Veríssimo et al. 2014b).

1.1 Surrogate species in biodiversity conservation

The term “surrogate species” is a widely used term in conservation biology and it generally means “*species that are used to represent other species or aspects of the environment to attain a conservation objective*” (Caro 2010b, p.1). However, the surrogate terminology and thus the roles of different surrogate types vary between studies and the boundaries between surrogate types are volatile (Caro 2010b, 2010c). A single species, a suite of species or a taxonomic group can act as an ecological surrogate (Caro 2010c, table 10-1). Also, the flagship species is a type of surrogate species (Ducarme et al. 2013). What distinguishes the flagship species from the other conservation surrogates is that unlike other surrogates, flagship species are chosen mainly based on arguments other than ecological criteria, such as their visual appeal (Smith et al. 2012), although this is not always the case (see e.g. Home et al., 2009).

There are at least two ways to categorize surrogate species into broader categories. One way is to classify surrogate species *based on their purpose* into three categories: 1) “*Indicators of biodiversity*” include species that are used to locate areas that have importance for conservation varying from regional to global scales (e.g. biodiversity indicators and umbrella species), 2) “*indicators of environmental change*” consists of species that are used to assess the impact of human activities on ecosystems (indicator species) and 3) “*flagship species*” that are charismatic species used in conservation marketing campaigns (Caro 2010c). These categories are not mutually exclusive, and thus the same species can belong to several categories (Caro 2010c). For instance, a flagship species can be used to attract funds and to direct the location of conservation areas, and in the latter case it is called “flagship umbrella species” (Caro 2010c).

Hunter et al. (2016) proposed another way to categorize surrogates into two groups *based on their goal*: 1) management surrogates and 2) indicator surrogates. While indicator surrogates are used as environmental monitoring tools when evaluating the state of ecological systems, management surrogates are used as management tools with broader goal orientation (e.g. conservation of biodiversity) (Hunter et al. 2016). In this categorization, both flagship species and ecological surrogates belong to the same category (i.e., to management surrogates).

1.2 Flagship species as conservation tools

The term flagship species has been used in conservation literature since its first appearance in the mid-1980s (Leader-Williams & Dublin 2000). Flagship species are usually defined by the cultural characteristics or the physical appearance (Ainsworth et al. 2018). Aesthetic appeal has been one of the most important attributes of a flagship species (Curtin & Papworth 2018; Ainsworth et al. 2018), and these species are often described using positively loaded adjectives such as charismatic (Leader-Williams & Dublin 2000; Ducarme et al. 2013), attractive (Small 2011), popular or cute (Smith & Sutton 2008). Besides being used as fundraising tools, flagship species are also used to raise conservation awareness and to establish protected areas (Caro 2010a).

Flagship species are used at least in two ways to attract support for conservation projects. Firstly, ENGOs appeal to potential donors using flagship species in their marketing materials and fundraising appeals (Clucas et al. 2008). The donors are then exposed to flagship species via images and photos that are presented in ENGOs websites, magazines and brochures (Clucas et al. 2008) as well as in billboards and posters (Wilcove 2010).

For instance, wildlife and nature magazine covers usually feature large-bodied charismatic mammals or birds (Clucas et al. 2008). Some ENGOs also use flagship species in their logos (Home et al. 2009), from which one of the most famous example is the WWF's Giant panda (*Ailuropoda melanoleuca*) (Nicholls 2011). In addition to this, live broadcasts via social media have made flagship species accessible to people in a whole new way (Skibins & Sharp 2019). For instance, WWF Finland have had a popular webcam "WWF Wildlife" for several years in Lake Saimaa presenting live stream on Saimaa ringed seals (*Pusa hispida saimensis*) (see <https://wwf.fi/en/wildlive/saimaa-ringed-seal/>).

Secondly, flagship species can be used to attract tourists to visit ecotourism destinations or zoos (Figure 1) and aquariums, and to potentially contribute to conservation (Xiang et al. 2011; Skibins & Powell 2013; Skibins et al. 2016; van der Meer et al. 2016). In this case, the audience has a direct exposure to flagship species either in situ (in their natural habitat) or ex situ (in zoos or aquariums) settings (Skibins 2012). Especially the "big five" species (elephant, buffalo, leopard, lion and rhinos) are important ecotourism attractions in Africa (Maciejewski & Kerley 2014). Also zoos, especially in the past, have relied on large charismatic flagship species when attracting visitors and raising conservation awareness (Skibins et al. 2017). However, I examine flagship species from the point of view of potential donors, leaving their usage as ecotourism attractions out of scope of this thesis.

The selection of flagship species in real-life conservation fundraising campaigns is surprisingly narrow. When examining the use of flagship species by 59 ENGOs, Smith et al. (2012) found that even though 80 different species were used in the campaigns, they represented



Figure 1. Siberian tiger (*Panthera tigris altaica*) and the Golden lion tamarin (*Leontopithecus rosalia*) are examples of charismatic species residing in the Korkeasaari Zoo in Helsinki, Finland. Photos: Piia Lundberg.

only 8 taxonomic orders out of 24, and were strongly skewed towards two orders (i.e. carnivores and primates, which accounted for 58% of the flagship species) (Smith et al. 2012). Among these 80 species, some had been used clearly more often as flagships compared to others (i.e. elephants and tigers) (Smith et al. 2012). It is worth to note, that although a flagship species is a single species (Caro 2010a), it is also possible to use several flagship species together as a flagship fleet (Barua et al. 2011; Root-Bernstein & Armesto 2013; Veríssimo et al. 2014a). Also a taxon or an ecosystem can be used as a conservation flagship (Veríssimo et al. 2018).

However, focusing on charismatic flagship species has its downsides. The limited number of flagships and the skew towards large-sized species can cause problems, for instance, reducing the willingness to protect non-flagship species (Douglas & Winkel 2014). It is not always evident that the funds channeled to flagship species conservation will simultaneously safeguard other co-occurring species (Williams et al., 2000). Furthermore, the narrow selection of flagship species does not necessarily meet the preferences of potential donors (Home et al. 2009). This stresses the importance of exploring new marketing methods and to examine the

attractiveness of different donation options from the potential donors' viewpoint.

1.3 Environmental philanthropy

Environmental philanthropic behavior is characterized as both “nonactivist public-sphere behavior” and private-sphere green consumerism (Stern 2000), which falls under the concept of pro-environmental behavior (Greenspan et al. 2012). Pro-environmental behavior, in turn, can be defined as behavior that aims to diminish the harmful effects of individuals' actions to nature (Kollmuss & Agyeman 2002) or additionally delivers benefits to the nature (Steg & Vlek 2009). While philanthropy in general is a common practice in many western countries, donations are not equally distributed between charity sectors (Charities aid foundation 2018a). Charities with a humanitarian or religious focus tend to attract most of the donations, while environmental charities, with some rare exceptions, receive only a small portion of donations (Parris 2001; Pessi 2008; Wiepking 2009; Carter & Ross 2014; Charities aid foundation 2018b; CAF UK 2019; Giving USA 2019). Nonetheless, there is an urgent need to understand the mechanisms behind environmental philanthropic behavior.

Existing donors as well as other potential donors form an important target audience for the ENGOs. For instance, individuals who follow the ENGO's social media pages, share an interest towards the work of ENGO itself and/or nature conservation. At the same time, they form a pool of potential donors (Saxton & Wang 2014). During the last years, the social media has become an increasingly important part of the daily lives of people and the use of related platforms (e.g. Facebook, Twitter, Instagram) has grown rapidly (Goldkind 2015; Giving USA 2019). At the same time, these platforms have offered charities new ways to engage donors (Mejova et al. 2014; Saxton & Wang 2014; Hu & Shi 2016), and many organizations have already seized this opportunity (Shier & Femida 2012; Mejova et al. 2014). The latest fundraising methods include online fundraising through mobile apps in smartphones (Choi & Kim 2016). Still there is a lot of untapped potential in the social media that could be utilized to interact with potential donors (Goldkind 2015). Therefore, it is important to explore views and preferences of potential online donors.

Environmental philanthropy has two main forms: monetary donations and voluntary work (Katz-Gerro et al. 2015). When participating in voluntary work arranged by an ENGO, the person donates their time instead of money. Especially in nature conservation, volunteering is an increasingly important form of environmental philanthropic behavior (Halpenny & Caissie 2003; Lorimer 2009; McDougale et al. 2011). Monetary donations to ENGOs can be either irregular one-off donations or regular monthly donations. Another way to support financially the work of ENGOs is to become a member of an ENGO. The donors can participate in volunteering projects in their home country and abroad (Lorimer 2009) as well as support financially national and international causes (Robson & Hart 2020).

Although a vast amount of literature on charitable giving exists (see e.g. Bekkers & Wiepking 2011a), research effort has not been evenly distributed among charitable sectors. Thus far, research on environmental philanthropic behavior has been scarce (Bauer et al. 2012; Greenspan et al. 2012; Katz-Gerro et al. 2015). Furthermore, knowledge on the determinants explaining the choice between donations of money or time is in many respects incomplete (Bauer et al. 2012). For instance, those factors associated with other types of pro-environmental behavior may not necessarily explain donating and volunteering for the environment (Greenspan et al. 2012). In addition, research on actual environmental philanthropy would produce beneficial information for ENGOs future conservation campaigns (Veríssimo et al. 2018).

1.4 Factors behind environmental philanthropic behavior

1.4.1 Socio-demographic background

Extensive literature reviews on charitable giving suggest that some socio-demographic characteristics, for instance, the level of education, field of education, religion, age, gender and income may be associated with donating behavior, but the results have been mixed in primary literature (Bekkers & Wiepking 2012; Wiepking & Bekkers 2012). One explanation for this could be that the effect of socio-demographic characteristics on donations differs between charity sectors. For instance, age may be an important driver of donating to religious charities (Bekkers & Wiepking 2012). It is also possible that younger generations are more inclined to donate to environmental charities (Greenspan et al. 2012). Educational background, instead, has not had a consistent role across all charitable sectors, but the authors found an association between education and donating to environmental and

animal charities in one study among the reviewed literature (Bekkers & Wiepking 2012).

Currently, only a small number of studies have examined environmental philanthropy, often focusing on the viewpoint of university students (e.g. McDougle et al. 2011; Greenspan et al. 2012; Katz-Gerro et al. 2015; Katz-Gerro & Lee 2017). The fairly homogenous sample in terms of age and education in these studies does not allow to make many conclusions on the impact of socio-demographic background on philanthropic behavior (cf. e.g. Bekkers 2010). Yet, some gender differences between countries have been found at least among students (Katz-Gerro et al. 2015): Female students in Israel and Korea were less likely to donate their time or money compared to male students, but no gender differences were found between German, Canadian or US female and male students (Katz-Gerro et al. 2015). McFarlane and Boxall (1996) studied donating and volunteering for the environment among Canadian birdwatchers and found that respondents with higher income or education level or those who resided in rural areas contributed more to wildlife conservation. According to their study, birdwatchers with higher income participated less in voluntary work, but no gender differences were found.

1.4.2 Other donor-related determinants

In addition to socio-demographic characteristics, a variety of other donor-related determinants may drive the donating behavior. One such determinant is the donors' psychological characteristics that encompasses attitudes, motivations and knowledge (Bennett 2003). For instance, environmental concern (Schultz 2001) or the awareness of negative environmental consequences (Stern & Dietz 1994) can be associated with pro-environmental behavior (Hansla et al. 2008), and thus with environmental philanthropic behavior. Although the first scale measures

attitudes and the second scale measures beliefs (Hansla et al. 2008), they measure the same three dimensions: 1) the self (egoistic dimension), 2) other people (altruistic dimension) and 3) the biosphere including non-human species (biospheric dimension).

Only a few studies on environmental philanthropic behavior have elucidated the relationship between donations and these three dimensions. Greenspan et al. (2012), McDougle et al. (2015) and Katz-Gerro et al. (2015) employed the environmental concern scale by Schultz (2001) to measure egoistic, altruistic and biospheric concerns, and to explore the possible link between them and environmental philanthropic behavior. Katz-Gerro et al. (2017), instead, used a slightly different approach and explored the potential relationship between a subset of Schwartz values including benevolence, universalism and conformity with different types of pro-environmental behavior (including environmental philanthropic behavior). From these values, benevolence closely resembles the egoistic dimension ("i.e. "altruism towards ingroups" Hansla et al. 2008, p. 2) and universalism corresponds the altruistic dimension (Katz-Gerro et al. 2017). Conformity, instead, was not included into existing scales measuring environmental concerns, and has rarely been studied in the context of pro-environmental behavior (Katz-Gerro et al. 2017). In addition, they included biospheric values as a separate value. A common denominator in all of these four studies was the positive association between the biospheric dimension and environmental philanthropy (Greenspan et al. 2012; Katz-Gerro et al. 2015, 2017; McDougle et al. 2015), but this association was more clear for proclivity to donate money than in the case of volunteering (Greenspan et al., 2012; Katz-Gerro et al., 2015; McDougle et al., 2015). However, because all of these studies have explored student samples,

we do not know whether these results apply to other potential donor segments with a more diverse socio-demographic background.

Materialism is another value that may influence environmental philanthropic behavior. It has been found to be associated with consumption choices (Goldsmith & Clark 2012; Hudders & Pandelaere 2012; Manchanda 2014), but does not preclude charitable giving (Mathur 2013). Thus far, little is known about the relationship between materialism and environmental philanthropic behavior. The third aspect that could be related to environmental philanthropic behavior is the level of environmental knowledge. While it is known that individuals with better ecological knowledge are less likely to participate in activities that are harmful to the other species (Barney et al. 2005; Vásquez Lavín et al. 2016), less clear is whether the ecological knowledge is associated with the willingness to pay (WTP) for different conservation targets, or whether it is related to choices made between different donation targets.

1.4.3 Factors related to the donation target

Various factors related to the donating itself may influence donating behavior (e.g. donating increases the feeling of happiness (Oppenheimer 2015)), but also different attributes of the donation target may have their own role in donation behavior or willingness to pay for conservation. In my thesis, I focus on the attributes related to the donation target. The influence of different attributes, such as aesthetic appeal, familiarity, conservation need and the local vs. foreign -aspect on donation behavior has not been very clear in the past research (Martin-Lopez et al. 2007; Fischer et al. 2011; Dallimer et al. 2015; Colléony et al. 2017). For instance, while Colléony et al. (2017) found zoo visitors preferring to donate to aesthetically appealing species, Veríssimo et al. (2018) did not find connection between flagship attributes

(such as familiarity, aesthetic appeal, location) and the amounts of donations when examining the outcome of an actual fundraising campaign. Hence, the role of these attributes may vary between audiences or countries.

1.5 Thesis outline and aims of the thesis

This multidisciplinary thesis combines conservation biology and conservation psychology and seeks to understand mechanisms behind environmental philanthropic behavior as well as tries to find ways to improve the use of flagship species in biodiversity conservation (Figure 2). In addition, this thesis aims to find ways to appeal to donors to save also those species that are aesthetically less appealing as well as to identify alternative or complementary donation targets that would encompass wider biodiversity compared to single species. In this thesis, I examine flagship species from the conservation fundraising viewpoint in Chapters I-IV and compare the fundraising ability of flagships against their ecological surrogacy power in Chapter IV. For ecological surrogacy, I adopt the definition by Hunter et al. (2016, p. 122), who define it as *“an ecological process or element (e.g., species, ecosystem, or abiotic factor) that is used to represent (i.e., serve as a proxy for) another aspect of an ecological system”*.

In Chapter I, I explored which factors and motivations are associated with donating to the conservation of mammals, birds and ecosystems (Figure 2). As online donors form an increasingly important pool of donors and on the other hand may have different preferences compared to offline donors (Saxton & Wang 2014), I focused on this less studied group of potential donors in the first study.

In Chapter II, I studied potential donor's choices between alternative flagship types including single species, flagship fleets, ecosystems and biodiversity, as well as explored whether a

variety of flagship attributes are associated with the choices. As the first study suggested that familiarity/locality may be associated with the WTP, I explored these attributes separately in this latter survey. I also investigated the effect of aesthetic appeal and the threat status on the choices. My aim was to distinguish different donor segments within a sample of potential donors as well as to explore possible country-specific differences in the choice of a donation target. Therefore, I conducted this latter survey in two countries.

In Chapter III, I studied whether the awareness of environmental consequences divided into three separate dimensions (egoistic, altruistic and biospheric), as well as materialism are associated with different forms self-reported

past environmental philanthropic behavior including donating, volunteering, membership of an ENGO and the donation amount (Figure 2). I also compared how these psychological variables are associated with the choice of a donation target in a simple choice experiment. The choice experiment included tree types of targets: single species (the charismatic Amur leopard (*Panthera pardus orientalis*) and less charismatic Siberian Jay (*Perisoreus infaustus*)), ecosystems (Baltic sea and peatlands) and biodiversity as a whole. All of these targets could be considered as three flagship types (i.e., single species, ecosystems and biodiversity). I was interested in whether the psychological variables are associated with the choice of a target for a real donation.



Figure 2. Thesis outline. The main focus of the thesis is to examine flagship species from the fundraising perspective and related environmental philanthropic behavior. The first two chapters of the thesis focus on flagship species as fundraising tools and compare donating to flagship species and to other flagship types. The third chapter of the thesis explores which factors are associated with environmental philanthropic behavior, and the fourth chapter examines charismatic flagship species from the viewpoint of their fundraising and surrogacy potential

In Chapter IV, I evaluated the surrogacy and fundraising potential of conservation flagships by a means of an overview of reviews (Figure 2). Such evaluation is a first step towards assessing the need for cost-effectiveness analyses of flagships in nature conservation. An overview of reviews encompasses systematically identified meta-analyses and reviews, whose findings are synthesized into one piece of research (Cooper & Koenka 2012; Hunt et al. 2018). Chapter IV builds on a data combined from WTP and surrogacy meta-analyses and reviews. In this chapter, I focused on three common ecological surrogate types including umbrella, keystone and biodiversity indicators. At the same time, indicator species that are used to monitor the quality of the environment (e.g., water quality) fall outside the scope of this thesis

2. Materials and methods

I used both qualitative and quantitative approaches in my thesis. The quantitative approach was used in Chapters I-III, which explore factors driving the environmental philanthropic behavior. Both quantitative and qualitative approaches were used in Chapter IV, which concentrates on evaluating the ecological surrogacy power of flagship species and their ability to attract funding based on published WTP meta-analyses and surrogacy reviews (including meta-analyses, systematic reviews and essays).

2.1 Study countries and target groups

I collected survey data in two phases from three countries: the first survey was conducted in Finland and the second survey both in the United States and in the United Kingdom. In all of these three countries, donating to charities is common, and thus private donors are an important source of funding for charities (Pessi 2008; Charities aid foundation 2018b; Giving USA 2019). However, statistics on charitable

giving vary between countries, and hence their accuracy, which makes the country-level comparisons difficult (Hoolwerf & Schuyt 2017a, 2017b), but to illustrate potential differences and similarities between these three countries, I present general lines of charity cultures in these three countries.

In Finland, there is a lack of both comprehensive statistics on philanthropy as well as scientific studies on philanthropic behavior (Hoolwerf & Schuyt 2017a). However, surveys on charitable giving conducted by the market research companies have concluded that 70% of Finns donate money to charities (Hoolwerf & Schuyt 2017a). In the US and the UK, more than half of the residents donate to charities: 62% in the US (CAF America 2019) and 57% in the UK (CAF UK 2019). The common feature of all three countries is that the most popular charities are those with a religious or humanitarian focus. Environmental philanthropists form a minority of the donors in the UK and US. In 2018 only 5% of the donations were targeted at environmental or conservation charities in the UK (CAF UK 2019) and in the US this figure was even smaller, at 3.6% of the donations (Giving USA 2019).

There is a lack of similar statistics for Finland, but according to a survey (n=1000) commissioned by the Slot Machine Association (Raha-automaattiyhdistys in Finnish) in 2008, which is the only survey studying donating to different charity sectors in Finland, up to 21% of the survey respondents reported having donated money to nature-related charities (Hoolwerf & Schuyt 2017b). Unfortunately, there was no information on what temporal period this figure covers (e.g., whether it was ever donated or within a year) and the situation may also have changed in more than 10 years after the survey took place. Participation in voluntary work is less popular than donating money in all three countries. Around one third of the US citizens (CAF America 2019) and

almost one third of the Finnish citizens have volunteered (Tilastokeskus 2018). In the UK 16% of the residents have participated in voluntary work (CAF UK 2019). However, the statistics do not show how volunteering was distributed between different charity sectors in these countries.

In this thesis, the subject of research was potential donors including both individuals who already have donated to conservation and those who have not donated at least in recent years. The first survey was aimed at potential online donors who are interested in nature conservation. To reach this target group, I collaborated with one Finnish ENGO (the Finnish Association for Nature Conservation) that shared a link to the survey in their official Facebook page. I conducted the second survey via Amazon Mechanical Turk (MTurk, <https://www.mturk.com>) in the UK and in the US. Mturk is commonly used for simple computational tasks, but it has also been utilized in collection of survey data (Clements et al. 2015; Sharma & Morwitz 2016; Thomas-Walters & Raihani 2016; Carrico et al. 2017; Echeverri et al. 2017; Goff et al. 2017).

In MTurk, a task (e.g. a survey) is offered by a Requester and it is called Human Intelligence Task (HIT) (Mason & Suri 2012). The workers of MTurk choose the HITs they want to complete and after completing a HIT they receive a monetary reward from the Requester (Mason & Suri 2012). As it is possible to restrict the HIT to be offered to individuals who reside in a certain country or have certain qualifications (Mason & Suri 2012), the surveys were restricted to be distributed only in the UK and the US. To ensure that our dataset included both donors who had already donated and those who had not recently donated, the respondents had questions concerning the past donating behavior in each survey.

2.2 Research ethics in Chapters I-III involving human participants

Chapters I-III are based on information collected through surveys; in which case the ethical requirements of human research must be taken into account. In these studies, I followed the guidelines of Helsinki Ethical Review Board in the Humanities and Social and Behavioral Sciences (<https://www.helsinki.fi/en/research/ethical-review-board-in-the-humanities-and-social-and-behavioural-sciences>). In accordance with these guidelines, an ethical review statement is needed for certain types of research that include, for instance, questions on topics that can cause anxiety or compromise the safety of the respondents, involve minors (under 15 years old), involve collection of personal data, or which would compromise the physical integrity of the respondents.

Chapters I-III did not have this type of study setup, and therefore an ethical statement was not needed in these studies. However, all studies including human participants are required to inform the study subjects about the study including information on the voluntary nature of participation, anonymity of the responses and the use and archiving of research material, and therefore I included a cover letter at the beginning of each survey to inform the research subjects on these issues. Thus, the respondent made herself/himself the decision whether or not to participate in the surveys. Because all the data collected in this project was initially anonymous, disclosure of respondents' identities was not a problem when conducting analysis or when presenting research findings.

2.3 Survey data collection

I used the stated preferences methods to explore factors associated with donating to flagship species and to other flagship types in Chapters I-II. The stated preferences methods include two types: the contingent valuation

method (CVM) and the choice experiment (CE). Both of these methods have long been used in environmental research to measure individuals' WTP for a variety of objects (Hanley et al. 1998; Carson 1999; Johnston et al. 2017; Subroy et al. 2019). The contingent valuation method has also previously been used to determine factors affecting the economic valuation of different targets (Kotchen & Reiling 2000; Martin-Lopez et al. 2007; Ojea & Loureiro 2007), but also to study WTP for alternative scenarios (Christie et al. 2006). The choice experiment has widely been used to study the role of various object-related attributes on the respondent's choices between different alternatives (Veríssimo et al. 2014a; Cazabon-Mannette et al. 2017; Curtin & Papworth 2018).

Both of these methods have advantages and limitations. The strengths of CVM include the flexibility (Carson et al. 2001) as well as the simplicity of the method (Venkatachalam 2004). However, it has also gained criticism regarding its validity and reliability (Venkatachalam 2004). Recently, the CE-method has grown in popularity in environmental valuation research, and its advantage over the CVM is the ability to obtain a price for individual attributes (Rakotonarivo et al. 2016). These attributes can be, for instance, rarity or familiarity of the target being valued (Christie et al. 2006). Another advantage of using the CE-method is that it allows the division of the respondents into smaller groups (i.e. segments) according to their preferences (Steven et al. 2016), for instance, with the help of latent class analysis (Vermunt & Magidson 2005a). This feature is useful because, based on previous literature, donors appear to be a heterogenous group with dissimilar preferences (Veríssimo et al. 2018, 2014b). Despite the differences of these methods, both of them can lead to very similar results (Bostan et al. 2020). Both methods have also been criticized for reflecting people's choices only in hypothetical situations

(Rakotonarivo et al. 2016). This "hypothetical bias" (see e.g. Schläpfer 2008; Hensher 2010) simply means a situation where a person's response to a survey and behavior in real life do not match (Hensher 2010), which may appear, for instance, as exaggerated WTP amounts (Ajzen et al. 2004). In the studies that I included in my thesis, I compared different donation options against each other, when the potential hypothetical bias is the same for all the targets being valued, and in this case, it may not be a similar problem compared to, for instance, a situation which seeks to find price tags for goods.

I used both types of stated preferences methods: the contingent valuation method in Chapter I and the choice experiment in Chapter II. In survey 1, I studied factors associated with donating to mammal and bird flagships as well as to ecosystems (Table 1). I chose mammals and birds as study subjects, because flagship species are typically from either of these taxa (Clucas et al. 2008). First, the respondents allocated hypothetical donations separately to ecosystems and species (mammals, group 1 and birds, group 2), and then they evaluated the influence of different motivations on their choices separately for species and ecosystems. The respondents had also questions concerning their educational background. They also responded to a quiz consisting of four questions that measured their knowledge of biodiversity conservation.

In addition, I collected data on past environmental philanthropic behavior (i.e., information on possible donations of time and money to conservation) and measured actual environmental philanthropic behavior by means of a simple choice experiment. The choice experiment consisted of a donation assignment, where the respondent made a choice between five alternative donation targets: two ecosystems, two species and biodiversity. The respondents chose one of

Table 1. Information on the methods and target groups in surveys 1 and 2.

	Online survey 1	Online survey 2
Country	Finland	United Kingdom and United States
Target group	Potential online donors	Potential donors
Survey dissemination channel	ENGOS Facebook page	Amazon Mechanical Turk
Method	Contingent valuation	Labelled discrete choice experiment
	ecosystems: all respondents	5 blocks of 12 choice sets (4
	mammals and birds: two	alternative flagship types
	separate respondent groups	+ none option)
Donation targets	8 mammals	41 species (UK); 38 species (US)
	8 birds	46 fleets (UK); 44 fleets (US)
	4 ecosystems	40 ecosystems (UK); 40 ecosystems (US)
		biodiversity (UK); biodiversity (US)
Payment interval	One-off donation	One-off donation

these five options for a real donation, which was made by a Finnish chocolate manufacturer that was sponsoring the first survey. The data that was collected in this section was used in the Chapter III.

In survey 2, I used a labelled discrete choice experiment to explore potential donors' choices between alternative flagship types (table 1). In a choice experiment the respondent is shown a certain number of choice sets each including alternative options, and the respondent indicates their preferences towards different alternatives by selecting one option from each set that they prefer most (Bostan et al. 2020). There were two separate approaches in the survey: "species approach" which applies species as donation targets (either as single species or as flagship fleets) and "holistic approach" that applies ecosystems and biodiversity (larger entities) as donation targets. Thus, each choice set included four donation options (single species, flagship fleet, ecosystem and biodiversity) and the none-option. The data collected in the survey 2 was used in Chapter II (Table 1).

In Chapter II, I was particularly interested in whether flagship attributes such as species aesthetic appeal, familiarity, location (occurs outside UK/US or occurs within UK/US) or threat (lower extinction risk/higher extinction risk) influence the choices. Thus, each option in a choice set consisted of a combination of attributes. Figure 3 illustrates the attributes related to the ecosystem and single species flagship types as well as the way they were presented on the choice card. When choosing the species for the choice experiment, I used a previous dataset from one of the authors of the Chapter II (Veríssimo et al. 2017) that included a pool of species with appeal and familiarity scores (see Chapter II and Appendix A). These 192 species had been used as flagships in real fundraising campaigns by two ENGOS. The attributes "appeal" and "familiarity" were "hidden attributes", which simply means that we assumed specific species to be appealing or familiar to the respondents, but this information was not revealed to them. For the option "biodiversity" I compiled a photo collage that included a photo of genes, different ecosystems and species from different taxa to illustrate the different facets of biodiversity.

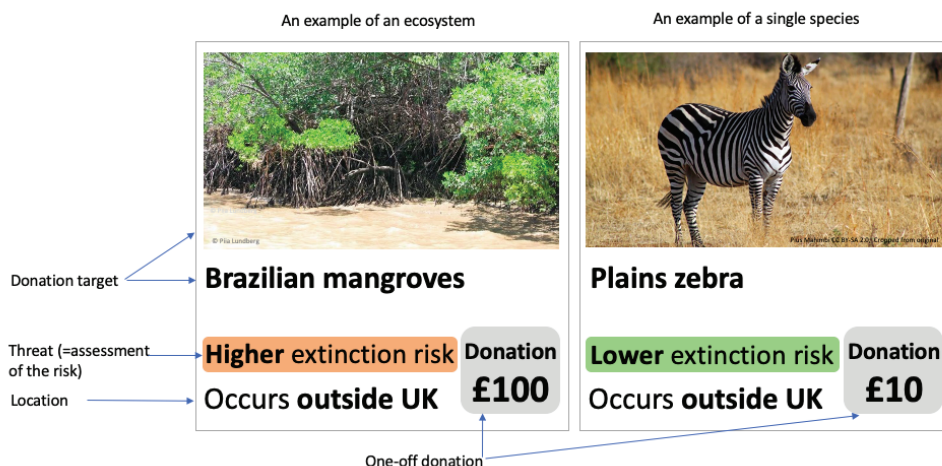


Figure 3. Examples of two flagship types (an ecosystem and a single species) and how the attributes were presented in a choice card. Species-based flagship types included two “hidden attributes” which were appeal and familiarity, and the ecosystems one “hidden attribute”, which was familiarity. Brazilian mangroves represent the following attribute combination: non-familiar, threatened ecosystem that occurs outside the UK and costs £100. The Plains Zebra (*Equus quagga*) represents the following attribute combination: appealing, familiar, non-threatened single species that occurs outside the UK and costs £10. Photos: ©Piia Lundberg (on the left) and Pius Mahimbi (CC BY-SA 2.0, cropped from original photo, <https://creativecommons.org/licenses/by-sa/2.0/>) (on the right).

As the survey was carried out in two countries, there were separate choice set designs for both of them (making a total of 120 different choice sets, totaling in 60 choice sets per country). These 60 choice sets in each country were divided into five blocks of 12 choice sets. Thus, each respondent had 12 choice sets consisting of five options (see the survey form with an example choice set in Appendix D in Chapter II). We used color photos for each option in a choice set. Images were needed for all four flagship types to ensure that all the options were equal to each other.

2.4 Conducting an overview of reviews

The final chapter of my thesis (Chapter IV) concentrates on relevant past published studies and explores the role of flagship species as ecological surrogates and their fundraising

ability by a means of an overview of reviews. An overview of reviews draws on previous meta-analyses and literature reviews and either makes a synthesis of their results or indicates gaps in current knowledge (Cooper & Koenka 2012; Hunt et al. 2018). It is a frequently used method to aggregate large amounts of information together, especially in medical (Hunt et al. 2018) and behavioral research (Cooper & Koenka 2012). Chapter IV encompassed meta-analyses and literature reviews from the following topics 1) studies on WTP for species and other conservation targets, and 2) studies evaluating ecological surrogacy power of different taxa. The latter included studies on umbrella species, keystone species and biodiversity indicators. The relevant papers for the overview of reviews were identified from three databases (EBSCO,

Scopus and Web of Science) as well as using Google Scholar.

2.5 Statistical analyses

Chapters I-III of my thesis are based on materials collected through surveys (table 2). As the WTP for conservation of birds, mammals and ecosystems was measured using an ordinal scale, I used an ordinal logistic regression analysis to study possible associations between these three donation targets as well as motivations and sociodemographic variables (chapter I). I used the Principal Component Analysis (PCA) to form willingness-to-donate-motivations from six drivers of WTP for the ordinal logistic regression analysis.

In Chapter II, I used the Scale Adjusted Latent Class analysis (SALC) to analyze the data from the labelled discrete choice experiment study.

The advantage of latent class models over other methods is that it separates respondents into segments, and thus produces more detailed results compared to methods that result in an aggregate model (Vermunt & Magidson 2005b). I tested the possible effect of the following attributes on the choices between flagship types: aesthetic appeal (applies only to species-based flagship types), familiarity, locality, threat status, cost, flagship type (single species, fleet, ecosystem and biodiversity) and the none-option. I ran the SALC-analysis using the Latent Gold Choice software version 5.1 (Vermunt & Magidson 2005a, 2014). The SALC analysis produced an output with Wald statistics that showed which of the attributes were significantly associated with the choices, as well as whether the attributes' effects were significantly different across segments (cf. Vermunt & Magidson 2016)

Table 2. Variables used in the analyses in Chapters I-III.

Chapter no (survey no)	Chapter I (1)	Chapter II (2)	Chapter III (1)
Response variable	Hypothetical donation amount	Hypothetical donation amount	Donation amount (self-reported), donated (dichotomous y/n), volunteered (dichotomous y/n), ENGO-membership (dichotomous y/n), target for donation (actual behavior)
Motivations/ attributes	Need of conservation, visceral motives, familiarity/locality, environmental knowledge	Aesthetic appeal, familiarity, threat, location, flagship type	Awareness of environmental consequences (egoistic, altruistic and biospheric dimensions), materialism
Covariates	Gender, level of education, field of education, ENGO-membership, residential area type	Gender, age, income, level of education, residential area type	Gender, age, income, level of education, residential area type

In Chapter III, I used logistic regressions and censored regression model (Tobit model) to study possible associations between materialism, awareness of environmental consequences, respondent's sociodemographic background and self-reported environmental philanthropic behavior. The reason for using a censored regression model was that our data was left-censored. This is quite typical for data on environmental philanthropic behavior, as some of the respondents may be reluctant to donate (Einolf 2011). I used the McFadden Pseudo R^2 and relative risk ratio (RRR) to measure the goodness of fit of the models in Chapter III. In addition, the Cronbach' alpha was calculated to measure internal consistency of the scales that were used in the study (ie. for the material value scale and for the three items in the awareness of environmental consequences scale) and these values are reported in the table 1 in Chapter III.

Chapter IV is an overview of reviews where all the data is collected from previous meta-analyses and reviews, which are summarized to tables. The reviewed WTP-meta-analyses were used to derive benefit transfer predictions of WTP-values for flagship species and other flagship types. Benefit transfer is a commonly used method in ecological economics to extrapolate values obtained from one context to another (Wilson & Hoehn 2006). The predicted WTP-values were converted correspond to Euros (€, 2019) to allow comparability.

3. Main results and discussion

3.1 Factors driving environmental philanthropic behavior

The aim of the first two chapters was to study which attributes make flagship species attractive and which factors are associated with

donating behavior. Another aim was to identify factors that could be used to help those species and other conservation targets that are unequal in terms of their external attractiveness. In Chapter I, I explored possible associations between motivations, knowledge as well as a variety of socio-demographic variables and donating to mammals, birds and ecosystems among an understudied donor segment consisting of potential online donors. The motivations of respondents were derived from a principal component analysis from their self-reported estimates of the impact of various factors on the choices.

The main finding of the Chapter I was that the factors driving donating to different flagships (birds, mammals and ecosystem) vary between respondents, at least among potential online donors. For instance, environmental knowledge was associated mainly with supporting the conservation of birds and ecosystems. Conservation need, instead, was the most prominent self-reported motivation affecting environmental philanthropic behavior: it was an important factor influencing the WTP for all donation targets. Species that were aesthetically appealing attracted more money compared to aesthetically less appealing ones, which implies that aesthetic appeal may nonetheless drive the choices between donation targets, albeit this association was not apparent in our regression models. We also found that the motivation familiarity/locality may also drive the choices at least when donating to birds or ecosystems. Thus, the first WTP-study suggests that the motivations behind donating behavior may vary between donation targets.

Then, I investigated whether the potential donors can be divided into separate donor segments based on their preferences (e.g., some segments may prefer local targets or threatened ecosystems) (Chapter II). At the same time, I explored possibilities to widen the

“flagship concept” beyond charismatic single flagship species. I was interested in whether the attributes such as aesthetic appeal, familiarity, locality and conservation need are related to donating to four different flagship types (single species, flagship fleets, ecosystems and biodiversity) and if so, to which flagship types.

This study supported previous research suggesting that the donors are a heterogeneous group, which can be divided into distinctive donor segments (Kanagavel et al. 2014; Veríssimo et al. 2014b). One of the main findings was that several donor segments were willing to support holistic concepts (biodiversity and ecosystems) instead of species-based targets. When looking at the segments in more detail, I found segments with preference towards local targets as well as segments that preferred threatened targets in their choices. I also found that the attributes aesthetic appeal and familiarity were associated with the choices, but based on the Wald test, the effects of these two attributes were not significantly different across segments, and thus could not be used in donor segmentation. This suggests that albeit these two attributes play some role in the choices, their role differs from that of other attributes, because their effect on all segments is of equal size and unidirectional. Quite similarly, Veríssimo et al. (2018) found donors to favor large-sized species in real fundraising campaigns, but this effect dissipated over time, which suggests that charisma or related characteristics are not the main driver in donation behavior.

In terms of attributes, familiarity was associated with donating behavior in Chapter II and together with the locality aspect in the Chapter I. In Chapter II, I explored both of these attributes separately. However, the results suggest that while both of these attributes were associated with donating behavior, the attribute familiarity is not suitable for segmenting the donors. Although these results

suggest that locality could be used for segmentation of donors, its impact may be country-specific (Chapter II). The role of nativeness could be further explored by comparing the WTP for conservation of different taxon (e.g. birds vs. mammals vs. reptiles) and other targets in future studies. Also, distance decay has been proposed to explain the preference of local targets in previous studies (Birol et al. 2006; Rolfe & Windle 2012), but the results suggest that this may not be the case. For instance, among potential online donors in Chapter I, the well-known charismatic mammals occurring in tropics attracted more combined funding compared to their counterparts occurring in Finland. Conservation need, instead, was an important driver of donation behavior in all forms of donation in my studies (Chapters I-II). The importance of conservation need as a factor influencing donation has also been observed in previous studies (Tisdell 2006, 2014; Tisdell et al., 2007). This could be one factor in raising the conservation value of aesthetically less appealing species in the eyes of potential donors, as increasing information has had promising effects on the willingness to support species that are in conservation need (Curtin & Papworth 2018).

In Chapter III, I studied the role of psychological variables on both self-reported and actual environmental philanthropic behavior. I measured actual environmental philanthropic behavior by the means of a choice experiment where the respondent chose one target for real donation from five options. I was specifically interested in whether two opposite ends of a continuum – awareness of environmental consequences and materialism – are associated with a variety of forms of environmental philanthropic behavior among potential online donors. In the case of self-reported environmental philanthropic behavior, the egoistic and biospheric dimensions of

awareness of environmental consequences were positively related to different forms of environmental philanthropic behavior. Compared to previous studies using student samples (Greenspan et al. 2012; Katz-Gerro et al. 2015), there were similarities and differences in terms of different forms of awareness of environmental consequences. The biospheric dimension, particularly, was similarly positively associated with donating in Chapter III than the biospheric concerns among university students in Katz-Gerro et al. (2015) and Greenspan et al. (2012), reflecting its importance in environmental philanthropic behavior. While the egoistic dimension was related to volunteering among potential online donors (Chapter III), it was not associated with volunteering among students (Katz-Gerro et al. 2015), which may be due to respondents' more varied background in Chapter III. Another possible explanation is the potential differences between online donors and other donor groups (Saxton & Wang 2014). In addition, more socio-demographic variables were associated with environmental philanthropic behavior in Chapter III, probably due to the more diverse sociodemographic background of potential online donors.

In addition, the potential online donors had a clear preference towards holistic targets over species-based targets in the choice experiment measuring actual donating behavior (Chapter III). However, it was surprising that the biospheric dimension was not associated with any or the donation targets. This may be because the biospheric dimension does not differentiate the concern for different donation targets (species, ecosystems or biodiversity, which were our donation targets), and therefore, a more nuanced scale to measure the biospheric awareness of environmental consequences (or concern) would be needed in the context of environmental philanthropic behavior. Materialism, in turn, was negatively

associated with all forms of self-reported environmental philanthropic behavior as well as with the donation amount. Interestingly, materialism was a more important driver of the choices between alternative donation options than the awareness of environmental consequences in the choice experiment, and the respondents with higher materialistic values preferred a charismatic species in their choices (Chapter III). While in the past fundraising campaigns the focus has been mainly on the flagship species and only seldom on broader issues (Smith et al. 2012), the results of Chapter III suggest that flagship types could be extended beyond charismatic single flagship species to raise funds for broader issues.

Socio-demographic background has variously explained donating behavior in previous studies (McFarlane & Boxall 1996; Greenspan et al. 2012; Katz-Gerro et al. 2015; Verissimo et al. 2018). In Chapter III, I found associations between sociodemographic background (i.e., age, gender, income, educational background and residential area type) and different forms of self-reported environmental philanthropic behavior. Despite this, the socio-demographic profile did not function as a principle for donor segmentation in Chapter II. Thus, although it was possible to identify donor segments with differing preferences, it was impossible to determine who belonged to these segments based on socio-demographic background. This suggests that other than socio-demographic variables are needed in donor segmentation, and in future research this could be further explored to identify relevant variables to be used in donor segmentation.

3.2 Flagship species from the WTP and ecological surrogate power viewpoint

In the overview of reviews, I examined the suitability of one taxon as a surrogate for others

(Chapter IV). Due to limited number of meta-analyses evaluating the ecological surrogacy power of different taxa as well as due to the variability of the research methods in the reviewed literature, it was not possible to conduct statistical analyses, and hence a qualitative approach was used to pull together the findings from the previous meta-analyses and reviews. Overall, I found only partial support for the ecological surrogacy power, as the cross-taxon congruence models explained only a small share of the variation (being up to 20%, which means how much the richness of one taxon explains the richness of other taxa) (see Table 3 in Chapter IV). Some meta-analyses evaluating the cross-taxon congruence concluded that surrogates should comprise multiple taxa instead of one taxon to cover wider biodiversity (Table 3 in Chapter IV). One option here could be to expand marketing to holistic concepts, which were also a preferred donation option in Chapters II-III, in which both stated preferences and actual donation behavior were measured. Furthermore, reviewed meta-analyses evaluating WTP for flagship species and other flagship types suggested that the flagship species' fundraising ability did not outperform the others.

3.3 Limitations and future research needs

The results of this thesis should be interpreted keeping in mind that the preferences between donor segments vary and may also be country specific. Common to all three countries, however, was the preference for holistic concepts over species-based donation targets (Chapters II-III). There are also some methodological considerations that needs to be taken into account. When using the stated preferences methods, there are factors that may affect the survey responses, for instance, the warm glow effect (Andreoni 1990). The warm glow effect refers to a situation where the

motivation for donating is purely egoistic and is related to the act of donating itself (Andreoni 1990; Crumpler & Grossman 2008). Warm glow, however, has not been an important driver of donating behavior in wildlife-related WTP-studies in the past (White et al. 2001; Jakobsen et al. 2012). It may still affect certain individuals within a segment (Jakobsen et al. 2012), but does not distinguish the donor segments from each other. In human studies, there is always the possibility that the participants of a survey will respond in a way they consider as socially acceptable (Nederhof 1985). Some research topics may be more susceptible to the social desirability bias, such as surveys on illegal activities or antisocial behavior (Krumpal 2013; Nuno et al. 2015) or those measuring health issues (Burke & Carman 2017). Surveys examining environmental attitudes and behavior may be less prone to such bias (Milfont 2009). In addition, the way the survey is conducted can have an impact on whether the respondents respond in a socially desirable manner. For instance, online surveys may be less prone to social desirability bias compared to in personal surveys (Braunsberger et al. 2007). Furthermore, memory can affect the accuracy of survey responses, but for relatively rare occasions such as donating to charities, it is less problematic (Bekkers & Wiepking 2011b).

It is also possible that the survey data is biased, for instance, in terms of gender or age, which may affect the results. In the MTurk sample, majority of the respondents were male (67.6% in the US and 57.2% in the UK). Nevertheless, these participants cover a more diverse population of respondents from socio-demographic background compared to other studies on environmental philanthropic behavior based on convenience samples of university students (cf. e.g McDougle et al. 2011; Greenspan et al. 2012; Katz-Gerro et al. 2015). Furthermore, the effect of socio-demographic variables is still unclear in the

context of environmental philanthropic behavior. While women have been found to support more likely environmental and humanitarian issues in social media measured through Facebook likes (Brandtzaeg 2017) as well as engaging more in pro-environmental behaviors compared to men (Mainieri et al. 1997), only some gender differences have been found in the context of environmental philanthropic behavior (Katz-Gerro et al. 2015). Other studies have found no differences between the genders (McFarlane & Boxall 1996; McDougale et al. 2011). Based on the findings of Chapter II, it appears that basic socio-demographic variables may not be suitable for donor segmentation, and therefore other potential variables should be explored in future studies. However, educational background (i.e., whether the respondent had education in natural sciences or in agriculture/forestry), which was interestingly related to donation behavior in Chapter I, could deserve further consideration in future studies.

In Chapters I-III, I studied both hypothetical and actual donations to ENGOs. In the first two chapters, I concentrated on hypothetical donations, which reflect intention to donate and thus differ from actual donating behavior. The results of Chapter II provide additional support for the previous findings that the donors consist of different segments (Kanagavel et al. 2014; Veríssimo et al. 2014b). This finding further supports the use of choice experiment as a method to study human preferences as well as the use of latent class analysis to identify these segments within the sample of potential donors. In Chapter III, instead, I studied both self-reported past donation behavior and actual donation behavior with the help of a donation incentive (a kind of incentive gift). This was carried out by including a donation experiment at the end of the questionnaire in which the respondent selected one of the five donation targets for a real donation.

Previous WTP-studies related to conservation of different objects have similarly focused mainly on hypothetical situations, but recent studies suggest shifting the focus from hypothetical situations to actual donations (Veríssimo et al. 2017, 2018). This would require closer cooperation between ENGOs and researchers but would at the same time benefit ENGOs. By allowing researchers to study environmental philanthropy across organizations, ENGOs would gain information that could be used to enhance the effectiveness of future fundraising campaigns (cf. Veríssimo et al. 2017).

There are also some limitations related to the statistical approach used in this thesis. In Chapters I-III, I used statistical significance testing; in which case the conclusions are based on the significance of the p-values obtained from the analyses. Statistical significance testing is a common statistical approach in many disciplines, but has also been subject to criticism related to, for instance, the reproducibility of the studies (see e.g., Hubbard & Lindsay 2008; Ranstam 2012; Lu & Belitskaya-Levy 2015), multiple testing (Benjamin et al. 2018) or the dichotomous division to significant and non-significant results based on the p-values (whether it is above or below a threshold) (McShane et al. 2019). The threshold value for statistical significance is generally considered to be $p < 0.05$ (McShane et al. 2019), but it has also been proposed to be changed to $p < 0.005$ to increase the reproducibility (Benjamin et al. 2018). There are also methods to reduce the problem of multiple hypothesis testing, such as Bonferroni correction (Abdi 2010).

In addition to these, there are also other statistical approaches that could be applied instead. For example, in the field of psychology, reporting of confidence intervals and effect sizes has been proposed as an alternative to p-values (Fidler 2006; Cumming 2014). However, also other methods may have similar limitations

to p-values with current threshold (McShane et al. 2019). In addition, future studies on environmental philanthropic behavior could also explore different types of relationships in the statistical analysis including interactions and quadratic relationships that were not tested in this thesis. There are also other types of relationships, such as moderated mediations (see e.g. Preacher et al. 2007), that could be explored in the future studies.

Although the results of Chapter II suggest that there are donor segments who are willing to support conservation of ecosystems, not all the ecosystems are necessarily equal in terms of their ability to attract funding. The results of Chapter II suggest that some donor segments prefer local or threatened ecosystems, but we do not know whether some ecosystems are preferred over others based on their aesthetic appeal, which was not addressed in Chapter II. However, based on a review of WTP meta-analyses (see Table 3, in Chapter IV) there are differences in people's willingness to pay for the conservation of ecosystems. For less popular ecosystems, fundraising with aesthetically appealing species could be one useful solution. Nevertheless, future choice experiment studies could explore which factors make the ecosystem appealing from the donor's viewpoint, and on the other hand, how to increase the conservation value of potentially unpopular ecosystems.

In addition, biodiversity was a preferred option in the choice experiment in Chapter II. The abstract nature of the concept of biodiversity makes it difficult to present in valuation studies (Bartkowski et al. 2015). In Chapter II, the option "biodiversity" was presented as a photo collage containing photos of all three facets of biodiversity (genes, species and ecosystems) to illustrate its multidimensionality. However, respondents were not provided with any definition for biodiversity, nor did I examine how they understood the concept of

biodiversity. However, I believe that presenting all of these three different dimensions in the picture instead of a single species or an ecosystem, which have been commonly used as biodiversity proxies in the past valuation studies (see a literature review by Bartkowski et al. 2015) better reflects the multidimensionality of biodiversity.

Furthermore, studies in the Chapters I-III have been made from the perspective of potential donors living in certain Western countries and are therefore not directly generalizable to all potential donors, for instance, those residing in emerging economies in Asia. Therefore, more research is needed from different perspectives and different target groups to increase our understanding of this less studied form of pro-environmental behavior. Another interesting research topic that could be elucidated in more detail in the future are the factors that influence people's choices between different charity sectors. For example, the motivational crowding-out phenomenon (see. eg. Kusmanoff 2017) and its potential relationship to donations would be interesting to explore in this regard.

4. Conclusions

In this thesis I have combined conservation biology and conservation psychology to examine the role of flagship species in biodiversity conservation from the conservation fundraising and the environmental philanthropy perspectives. Overall, this thesis found further support for the idea that potential donors consist of multiple segments with dissimilar preferences, which resonates the findings of previous studies (see e.g. Veríssimo et al., 2018, 2014b). The results of my thesis are particularly relevant to online donors, which is a less-studied group of donors (Mejova et al. 2014), but whose importance is likely to grow in the future (Shier & Femida 2012; Küchler et

al. 2020). As changes in the state of the world can affect people's propensity to donate, of which the most recent example is the Covid-19 pandemic originating in the spring of 2020 (AFP, 2020; CAF 2020), it is increasingly important for charities to streamline their fundraising. Focusing on the most relevant segments could enhance the fundraising abilities of ENGOs in this increasingly competitive environment. Therefore, it would be useful for organizations to identify the most important donor segments for their own organization.

It was particularly important for the potential online donors to support targets that are in conservation need as well as holistic donation targets (biodiversity and ecosystems) in all of the studies examining environmental philanthropic behavior (Chapters I-III). ENGOs have often focused on species-based conservation targets and thus donating to individual species has been an important part of fundraising for many conservation organizations (Smith et al. 2012), but the preference towards holistic flagship types in Chapters II-III in my thesis suggests that there is a need to broaden the selection of donation targets in conservation fundraising campaigns to meet the demand of different donor segments.

Furthermore, the aesthetic appeal of a species seems to be associated with willingness to donate as aesthetically appealing species attracted the largest sums and was also associated with the choices within some of the segments among the UK and US respondents. Therefore, also charismatic flagship species are needed for fundraising. However, the role of aesthetic appeal was less clear compared to other attributes, such as conservation need/threat status and the location, which both were more important drivers of donating according to my studies. Therefore, in the light of the results of my thesis, aesthetically less appealing species (and other less charismatic

targets) could benefit from highlighting their need for protection, which was important for certain donor segments, at least among potential donors.

Chapter IV revealed a gap in the knowledge related to the fundraising and ecological surrogacy potential of conservation flagships, and without further research, recommendations for an effective flagship cannot yet be made. However, given this current lack of information, the results of Chapter IV can be still applied in the selection of flagships alongside the results of Chapters I-III. Similar to the findings of Chapters I-III, the results of Chapter IV suggest increasing the use of holistic conservation targets in future fundraising campaigns, as only limited support for the ecological surrogacy power of single species or single taxon was found, and also as some of the reviewed meta-analyses even suggested to use broader entities as ecological surrogates. In the same way, conclusions from the WTP-meta-analyses did not find additional support for the use of single species in conservation fundraising.

The results also suggest that different factors influence the donations of money and time. For instance, respondents who live in rural areas or have smaller income are willing to support ENGOs by donating their time by participating in voluntary activities. However, although in the case of self-reported environmental philanthropic behavior, the socio-demographic background was associated with environmental philanthropic behavior (Chapters I and III), the same variables did not work in donor segmentation (Chapter II). Therefore, more research is needed to identify factors to guide the segmentation of the potential donors. Future research could look for new alternative variables for segmentation, of which, for example, psychological factors, environmental values and attitudes are one option to consider.

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